General Classification of Sedimentary Rock

Lecture 9#

There are four different types of sedimentary rocks:

- *clastic* - (or detrital) - consist of consolidated fragments
- *biochemical* - consist of the shells of organisms
- *organic* - consist of carbon-rich plant remains
- *chemical* - consist of minerals deposited directly from hydrous solutions

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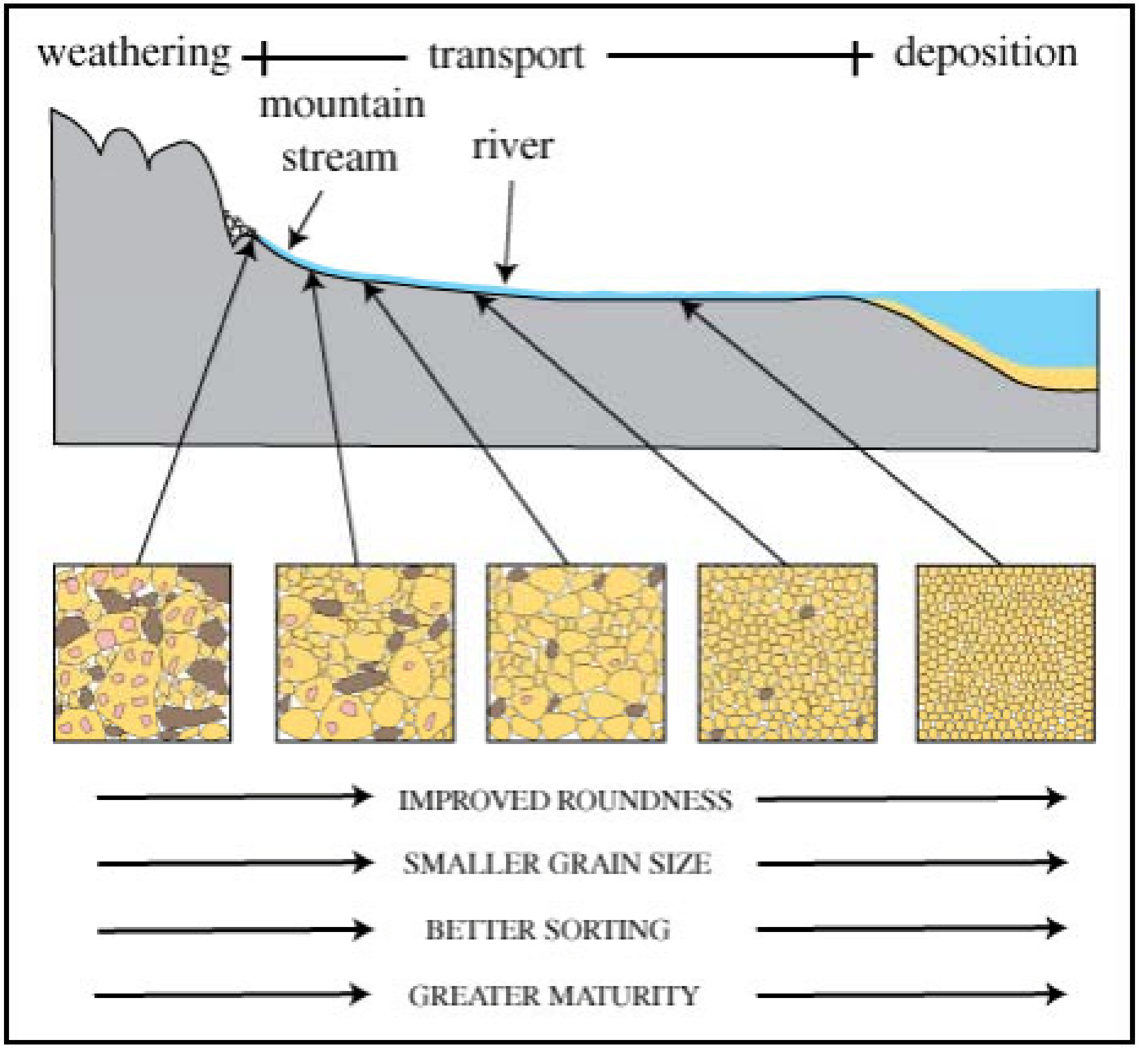
Clastic sedimentary rock



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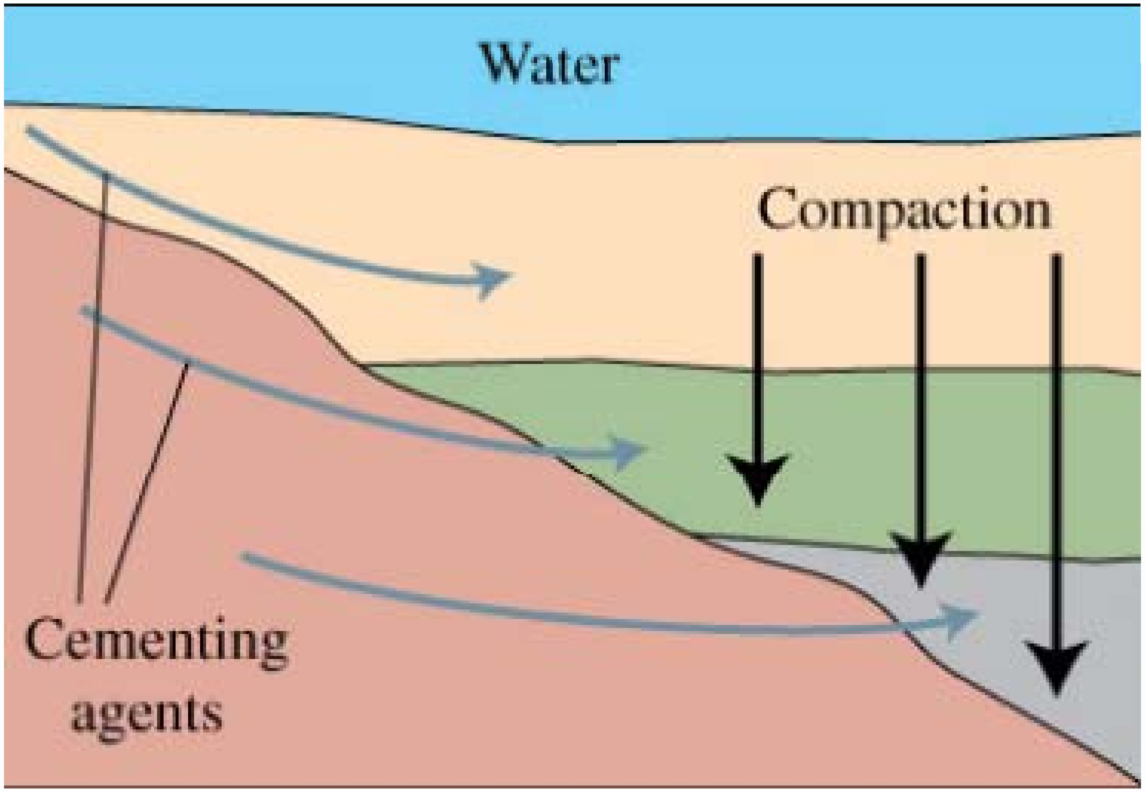
a) *Weathering* (dominantly physical) forms fragments (detritus).
b) *Transport*. Rock fragments fall off the outcrop and/or are moved by wind, water or ice. Since water and wind move small particles further than large ones they become sorted by size during transport. The combined processes of weathering and transport are referred to as *erosion.*
c) *Deposition*. Particles settle out of the medium of transport. For example when a glacier melts it deposits its load of rock particles. When flowing water slows down the coarsest particles settle out, or when the wind dies down sand particles are deposited.
d) *Lithification* (consolidation) is the process whereby loose sediment is transformed into solid rock. The pressure resulting from burial under younger sediments presses water and air out of pore spaces and results in *compaction*. Sand can compact by 10-20%, whereas mud (a mixture of clay and water) can compact by as much as 50-80%. Compacted sediment may then be *cemented* by the deposition of new minerals (usually quartz or calcite) that are derived from groundwater. Lithification is the combined result of compaction and cementation (Fig.6.7).



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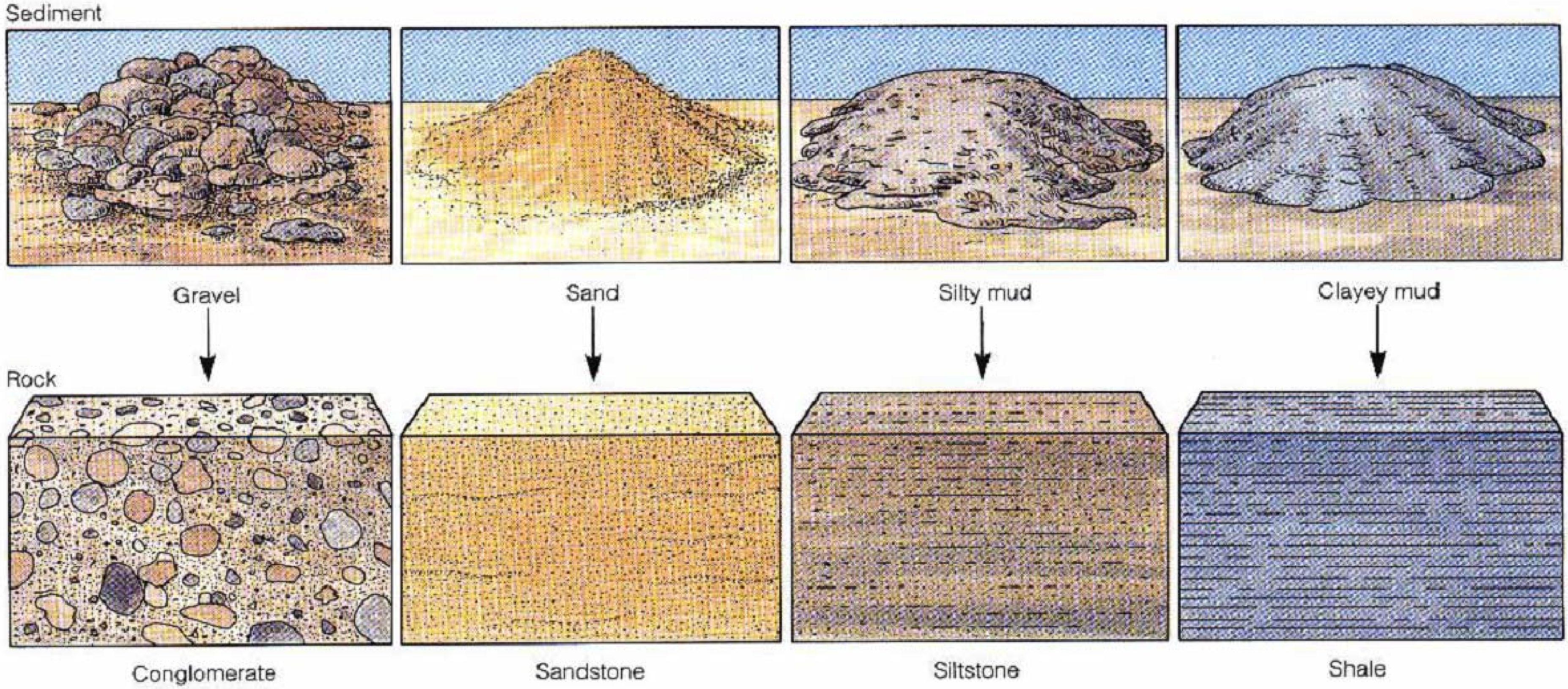
Sediment
Gravel
Sand
Silty mud
Clayey mud
Rock
Conglomerate
Sandstone
Siltstone
Shale

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Conglomerate

Rounded gravel sized sediments cemented together.

Indicate High-velocity water borne transport.

Conglomerate and Breccia

- Both are composed of particles greater than 2mm in diameter
- Conglomerate consists of rounded gravels
- Breccia is made of large angular particles

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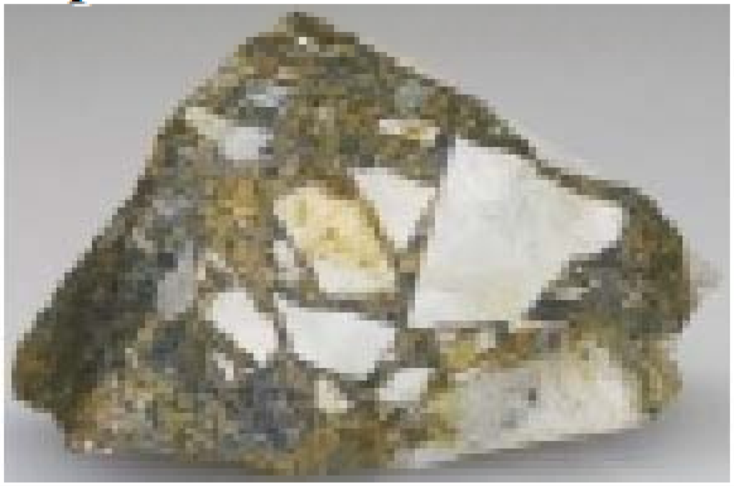
Breccia

- Like a conglomerate *except* the particles are angular, NOT rounded.
- Indicates little transport from source.

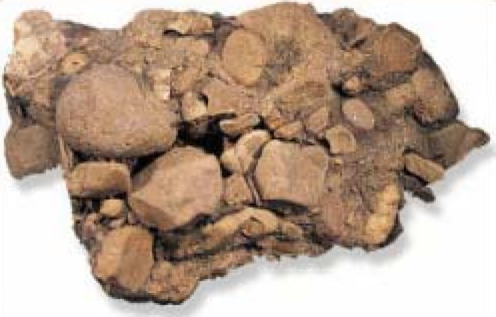


Sandstone

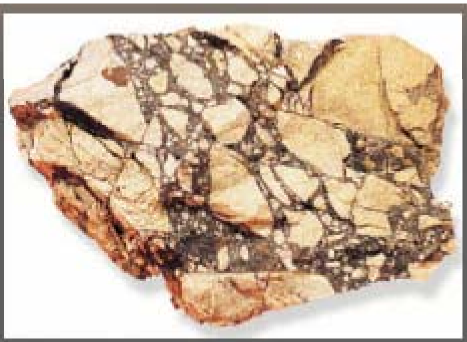
- Composed of sand-sized particles.
- Forms in a variety of environments.
- Sorting, shape, and composition of the grains. can be used to interpret the rock's history.
- Quartz is the predominant mineral.
- Siltstone is similar with smaller grains.

Shale

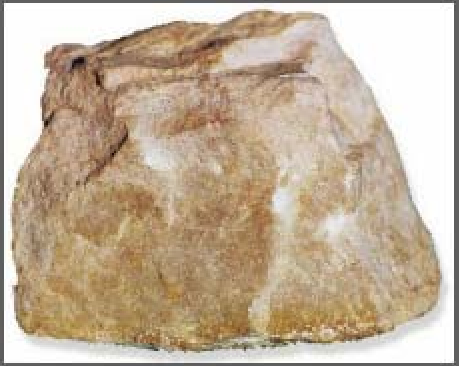
- Composed of clay-minerals (extremely small particles).
- Deposited only in quiet non-agitated water. Common in deep water basins.
- Often contains organic matter (dark) and fossils.



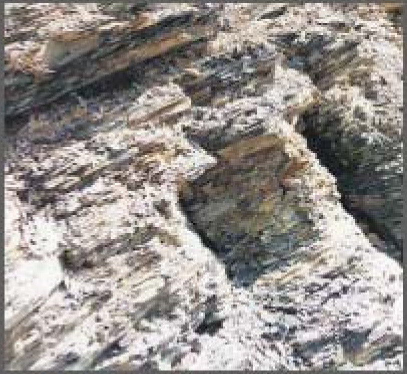
Conglomerate



Sedimentary breccia



Quartz sandstone



Shale

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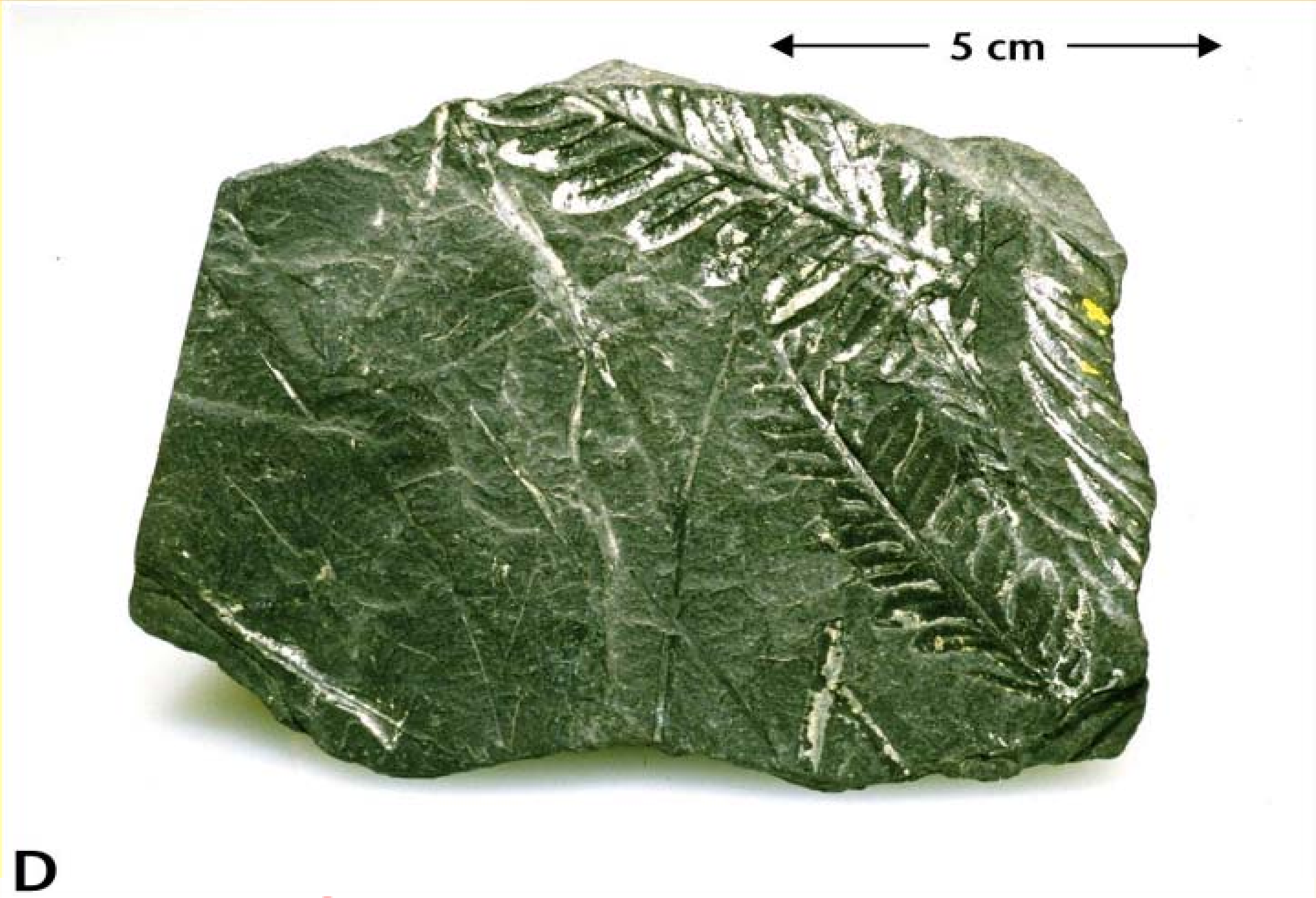

Shale with plant fossils

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